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Working Paper

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THE STARTUP ENVIRONMENT AND FUNDING ACTIVITY IN INDIA

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Abstract

India has an estimated 26,000 startups, making it the third-largest startup ecosystem in the world, recording consolidated inflows of over $36 billion in the past 3 years with 26 “unicorns” – startups valued over $1 billion. The Indian startup ecosystem has expanded quite rapidly mainly through private investments including seed, angel, venture capital, and private equity funds, with technical support from incubators, accelerators, and the government. The government, for its part, is creating an enabling environment through its flagship Startup India initiative, which came into force in 2016. With India pushing towards a knowledge-based and digital economy, the government is attempting to deploy ICT infrastructure and provide policy support for enhanced e-governance, investments, and technology innovation through research and higher education to support entrepreneurship and spur economic growth. Data suggest that the expansion in the startup ecosystem has largely been clustered in the large (Tier 1) cities and states with financial depth, and especially in IT-enabled sectors including e-commerce, transport, and finance. Small businesses beyond the metros are not fully aware of, or integrated into, programs that provide startups with various government incentives and tax breaks. Despite the progress made so far, Indian businesses face huge challenges, such as the unorganized and fragmented nature of the market in most sectors, a lack of clear and transparent policy initiatives that startups can tap into quickly, as well as a lack of infrastructure, a lack of knowledge and exposure, and complications in doing business. Creating more awareness of government initiatives and incentives, credit disbursement to priority sectors, promoting outreach and network benefits to Tier 2 and Tier 3 cities, as well as easing financing and tax breaks for foreign and domestic investors could improve opportunities for startups in India.

Keywords: startups, India, digital economy, small business, entrepreneurship, financial instruments, venture capital, government policy and regulation

JEL Classification: M13, N85, G23, G24, G28

Contents

1. INTRODUCTION

For decades, India has been known for its ICT prowess, and more recently for its rapid economic development through its digital transformation and innovation. Along with its recent rapid economic development, it has also become one of the largest startup ecosystems in the world. The Indian startup ecosystem has steadily evolved in the past few years through an increasing number of angels, VC funds, incubators, and accelerators, as well as support from government initiatives such as Digital India, Startup India, and Smart Cities that will amplify startup and investment activity across cities and new sectors. This growth in startup investments and the number of unicorns comes in the wake of rapidly increasing spending power, mobile internet usage, access to new consumer markets, social media adoption, technological innovations, and favorable consumer demographics.

The current wave of startups began around 2004, when Silicon Valley Bank set up its first office in Bengaluru. Since then, the momentum of investment in startups has increased. By 2015, India had 10,000 startups, almost the same number as in the People's Republic of China (PRC) (Grant Thornton, Assocham India 2016). It also had eight "unicorns" – startups with a valuation of $1 billion or more – across e-commerce marketplaces, transport and mobility, logistics and hyperdelivery, ad:tech, digital banking and finance, online aggregators, and analytics.

In August 2019, startups in India raised $1.4 billion across 50 deals compared to just $182 million across 32 deals the year before (IVCA-EY 2019) – a sevenfold increase. IVCA-EY (2019) estimates that India has over 50,000 startups, with 3,500 of these growing at 30% year on year, making it the world's third-largest ecosystem (behind the US and the PRC).

1.1 The Inflection Point for Indian Startups

The period 2014–15 is considered an inflection point for the Indian startup ecosystem with the emergence of six "unicorns" in those 2 years. Since then, the Indian startup ecosystem has evolved steadily owing to several underlying factors, including:

- **Demographic dividend:** 600 million citizens are still under the age of 25, with rising internet, smartphone, and financial penetration
- **Market size:** growing middle class with increasing disposable income and social media adoption, changing consumer demographics that were previously inaccessible, with mobile and data tariffs among the lowest in the world
- **Number of startups** incorporated and increasing number of active domestic and foreign angels/VC funders
- **Political will:** improvement in ease of doing business and conducive innovation environment through adoption of digital technologies and government initiatives like Startup India and Digital India and establishing regulatory infrastructure
- **Spillover effects from large, listed (and unlisted) technology firms:** many angel investors and a growing pool of experienced serial entrepreneurs
- **Higher education:** India has a huge pool of engineering and technical graduates (though many need training before they can be employed)

- **Emergence of startup hubs:** agglomeration effect in Tier 1 cities has created larger clusters of startups, investors, and supporting infrastructure
- **Industry-academic-government linkages:** growth in the number of university and industry-led incubators and accelerators, and setting up of government patent hubs

One of the major shifts in making digital services more accessible to the masses was spurred by the telecom industry shake-up, driven largely by a new entrant, Reliance Jio's price war over data in 2016. This near commoditization of the internet gave Indians the world's cheapest data plans and opened up an entirely new user base.

The past couple of years have also witnessed a rise in the value of private investments and the number of VC funds, both from within India and globally. An interesting trend has come from the East, including Japan's SoftBank Group, which had invested over $8 billion by the end of 2018, followed by the PRC's Tencent investment holding company, and Singapore's sovereign wealth funds, GIC and Temasek. With the Chinese startup market becoming overcrowded and overheated, and more mature markets like Japan and the Republic of Korea slow to build their startup ecosystems, India has become an attractive destination among emerging markets (Table 1).

Table 1: Top VC* investments in India (2019)

Company	Investors	Amount (US$M)
Udaan	Tencent, GGV Capital, Altimeter Capital, Hillhouse Capital, DST Global, Lightspeed Ventures, Others	586
Delhivery	SoftBank Corp, Carlyle, Fosun Group	413
FirstCry	SoftBank Corp	400
Ola Electric Mobility	SoftBank Corp	250
Grofers	SoftBank Corp, Tiger Global, Sequoia Capital India, KTB Ventures	220

*As of 24 December 2019, VC is defined as Seed to Series F investments in companies less than 10 years old (since registration).

Note: PE investments are not included in this list.

Source: Venture Intelligence.

Even as the startup ecosystem grew, exits and M&As were few and far between. That changed in 2018 when Walmart acquired a 77% stake in Indian e-commerce giant Flipkart for $16 billion in the world's biggest e-commerce M&A deal. The deal reflected the scale and momentum at which startups in India had grown.

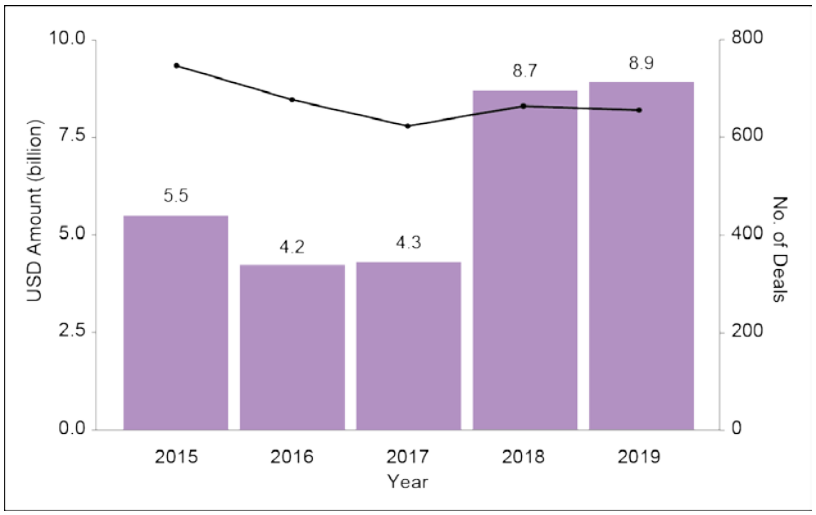
Despite its rapid expansion and vibrancy, India's startup ecosystem is far from mature. For a long time, Indian entrepreneurs did not focus on solving local problems or working with cutting-edge technologies. This reluctance can be partly attributed to the lack of bold venture funding, given the lack of investors with deep pockets, resolve, and patience. Further, changes in consumer behavior, low price points, long gestation periods, and cash burn, especially due to the diversity of stakeholders in a democratic and decentralized structure, did not allow for reforms to be rolled out at the same speed as in the PRC (Sharma and TN 2018).

2. INDIA'S STARTUP OPPORTUNITY AND FUNDING OPPORTUNITIES

2.1 Recent Trends in Investment in Indian Startups and Data Availability

Between 2011 and 2015, investment values increased at a compound annual growth rate (CAGR) of over 75% and the number of deals at a CAGR of over 80%. Since then, VC investments have increased rapidly according to various estimates and peaked in 2019 (Figure 1).

Figure 1: VC* Investments into Startups in India (2015–2019ytd)



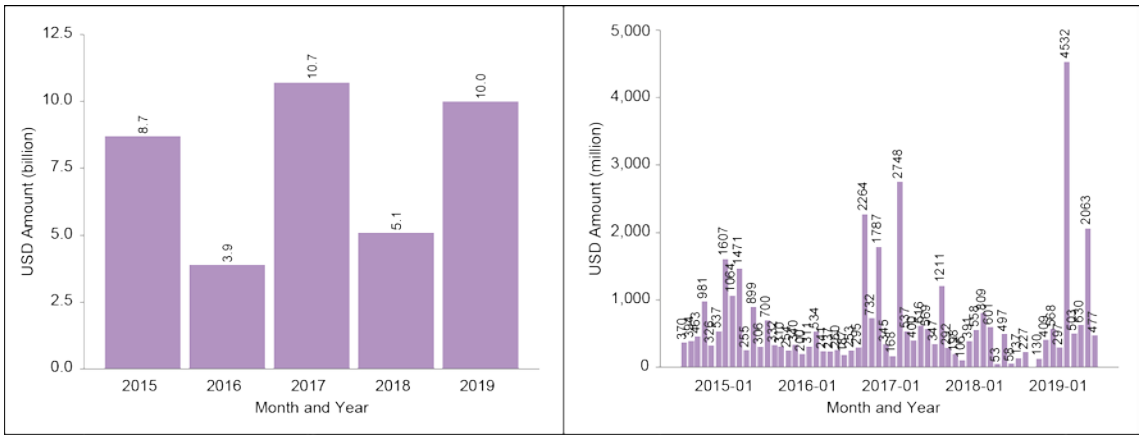
*VC is defined as Seed to Series F investments in companies less than 10 years old.

Source: Plotted by authors based on data from Venture Intelligence | As of 24 December 2019.

A challenge for obtaining data on startup finance is that they are mostly in the private realm where companies charge a subscription fee for accessing investment data and corporate financials (e.g., Venture Intelligence, Tracxn, etc.). For this paper, we have used two main sources for tracking startup funding:

1. Proprietary data from Venture Intelligence (VI): a private firm launched in 2002 and considered a leading source of information and analysis on private company financials, transactions (private equity, venture capital, and M&A), and their valuations in India. VI provided only anonymized startup investment data that provided general trends, without any detailed/company-level data, as that would incur a fee.
2. Open-source data web-scraped from Trak.in: a business news and opinion site that also tracks investments in startups but with open-access data that is sourced publicly. This data was useful because it tracks detailed information but lacks clear definitions and classification. It required data-cleaning but it was helpful for our empirical analysis, where, for example, we needed granular company-level investment data across various states. The charts below roughly show the difference and details in the data in terms of the value of startup investments, which can be compared with the earlier chart from VI (Figure 2).

Figure 2: Yearly and Monthly Investment data into Startups in India from trakin.com, 2015–2019



Source: Authors based on data compiled from www.trak.in.

2.2 Why India Can Be a Hub and Testing Ground for Innovation and Startups

By leveraging its strengths in human capital and ICT services, and transitioning to a digital and knowledge-based economy, India is fast becoming a breeding ground for innovation and startups. Knowledge economies use ICT, innovation and research, and higher education and specialized skills to create, disseminate, and apply knowledge for growth. According to the four indicators of the World Bank's Knowledge Economy Index, India ranked 109th out of 145 countries covered in 2012; however, there has been no update to that study. India moved up five spots from 2018 to 2019 in the Global Innovation Index (GII) from 57th to 52nd place, among 129 countries across 80 indicators ranging from rates of intellectual property filing and mobile-application creation to spending on education, scientific and technical publications, as well as many other criteria.

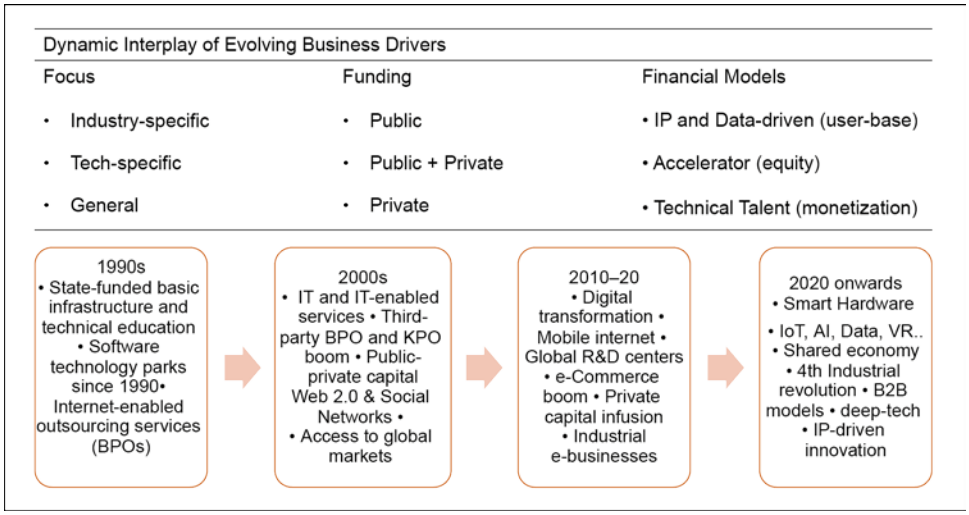
This is promising, but challenges also exist in areas like developing low-cost technologies for price-sensitive customers, popularly known as "frugal innovation." Such low-ticket, low-tech solutions need to be implemented on a large scale to address underprivileged and underserved populations. Such swift technological advances provide startups in countries like India – unburdened by older, legacy technologies – with the ability to leapfrog and leverage mobile to further the digital and mobile data transformation. Payments, banking, and associated services are also quickly moving towards mobile. In fact, FinTech has been one of the most well-funded sectors in the past 2 years (Rajan 2019).

Despite having moved up 14 places in a year and ranking 63rd out of 190 nations in the Ease of Doing Business 2020 rankings, India still lags behind in areas such as enforcing contracts (163rd) and registering property (154th) (The World Bank Group 2020). However, it is encouraging to know that the latest reforms are in the Doing Business areas of Starting a Business, Dealing with Construction Permits, Trading Across Borders, and Resolving Insolvency, among others.

The shift to a knowledge-based economic growth model is critical for India to reinvent its comparative advantages as labor- and capital-intensive manufacturing are fading. With the fourth industrial revolution (Industry 4.0) underway, future trends present a great opportunity for startups to disrupt and innovate by using technologies such as

blockchain, the Internet of Things (IoT), artificial intelligence (AI), and machine learning (ML), among others. With the right backing and environment, startups can play a big role here, especially with a culture of research and innovation with respect for intellectual property rights, and flexible capital and labor markets (Figure 3).

Figure 3: Evolution of Innovation Ecosystems in India



Source: Adopted and modified by authors for the Indian case from: Sharma and Meyer 2019.

2.3 Definition of Startups in the Indian Context

Though there is no precise definition, the accepted characteristics of a "startup" span its age, scale of operations, and mode of funding. It is usually defined as a young company, a few years old, and yet to establish a steady stream of revenue. These firms have a small scale of operations, usually with a working prototype or paid pilot with the potential to grow and scale rapidly. They are initially funded by the founders' own private network of friends and family and actively seek additional funds to sustain themselves and become a viable business.

As an example, the GoI's Startup India program defines a "startup" as a company (PIB 2017) that is:

1. Headquartered in India with not more than ten years since incorporation or registration
2. Having an annual turnover of less than INR 1 billion (roughly $14 million) (Startup India 2019)

Following a revision in 2019, Startup India has updated its list of benefits (Startup India 2019) to include income tax exemptions on capital gains and investments above fair market value, options for self-certification on various compliances, fast-tracking of patent applications at a discounted rate, the ability to sell to the government, and the ability to wind up a failed company within 90 days. Registering with Startup India provides exemptions from Angel Tax, access to a Knowledge Bank, partnered services, online courses, and innovation challenges. The program has recognized nearly 27,000 startups (Startup India 2019).

In 2019, the DPIIT worked with representatives from the startup ecosystem to do away with problems stemming from what was labeled as the controversial "Angel Tax" (levied

at 30% when a privately held company raises funds at a rate higher than its fair valuation) – an anti-money-laundering provision since 2012 that was allegedly being misused. The law was originally introduced to deter high-net-worth individuals (HNWIs) from investing in bogus startups (or shell companies) as a way to launder money. The Angel Tax was criticized for stifling startups that had raised equity funding from unregistered foreign investors.

2.4 Different Types of Funding for Startups in India from Early to Late Stage

Financing for startups in India has followed the Anglo-Saxon model, which encourages entrepreneurial activity through financing from private and venture capital, as they are considered too risky by banking institutions. Venture capital (VC) and private equity (PE) are not regulated as in Europe. Financing avenues extend from friends and family at the very early stages, then move to seed/angel investors, and finally VC and PE money. Once the company is well established, it can then take on debt from banks, closed-end funds, and investment banks once they are ready to absorb late-stage investments, and edge towards listing an initial public offering (IPO) (Table 2).

Table 2: Funding Available for Startups at Each Stage of Their Development

Funding Type (Avg US$ Value in India)	Startup Stage	Investor Type and Nature of Funds Raised
Angel funding (10K–1M)	Early/idea stage: seek funds for developing prototype of product/service	Individual/angel investors who provide mentorship to founders and early access to markets
Seed Funding (10K–1M)	Early/idea stage: test and develop the idea and require R&D funding (e.g., for patents)	Individual investors and VCs focused on seed funding to further support startup until it generates revenue
Pre-Series A (10K–1M)	Early stage: with some market traction looking for individual-bridge round	Bridge between individual and institutional investors focused on smaller cheques
Series A (1M–5M)	Early stage: demonstrated traction ready to expand operations and uses funds for capex, working capital, expansion	First round of institutional investors with existing individual investors and may include corporate venture arm of large corporations
Series B (3M upwards)	Early stage: established with demonstrated traction and needs to scale after demonstrating product-market fit	Second round led by institutional investors, can include existing individual investors, and venture capital funds
Series C, D (6M upwards)	Growth stage: established and successfully running at scale and poised to expand using funds for capex, organic, or acquisition growth	Institutional investors including large/late-stage VCs, Pes, hedge funds, and banks come in, buy out early investors, often with handsome returns
Series E, F, and beyond (15M upwards)	Growth stage: well established and successfully running at scale and maybe poised for IPO	Institutional investors including large/late-stage VCs, Pes, hedge funds, and banks fund further expansion or increase valuation before IPO

Source: Compiled by authors from various sources including startups.com and coporatefinanceinstitute.com.

Methods used elsewhere in the world have not been tried or are not applicable in India. For instance, in Japan and the US, equity crowdfunding has been a good option for startups. Pre-order crowdfunding allows customers to order products and startups advertise their products produced on the internet and raise funds for their operation. This is legal in India though not widely prevalent. Another way is to collect small amounts from

individuals, as little as $10–$50 for a stake in the company called a "hometown investment trust" (HIT) fund to help riskier borrowers such as startups to get seed finance (Yoshino and Taghizadeh-Hesary 2014). However, this method, known as "equity crowdfunding," has been deemed illegal in India by the country's financial regulator, the Securities and Exchange Board of India (SEBI) (Kaira 2019).

Similarly, many Asian countries have money lenders that provide finance to MSMEs and startups. These lenders might essentially be loan sharks, who are not regulated and tend to charge high interest rates. While the MSME sector in India does count on loan sharks, early-stage startup funding is dominated by Seed/Angel investors, HNIs, some VC firms, and a growing list of FinTech and nonbanking financial companies (NBFCs).

Besides Seed, VC, and PE funding, accelerators have also helped the startup ecosystem grow. The big trend in the past 3–5 years has been various accelerator programs – a type of accelerator sponsored by a profitable company in a bid to discover and evaluate new technologies and solutions by providing grants, paid pilots, or joint go-to-market options, while they charge a flat fee or acquire an equity stake of 6%–8% in the startups they help.

Accelerator and incubation programs span the following formats:

- **Corporate accelerator programs** by multinational companies (MNCs) such as Google and Microsoft, etc. and Indian groups such as Reliance, etc.
- **Public–private partnerships (PPPs)** such as T-Hub, T-Labs, Startup Village, etc.
- **Department of Science and Technology (DST)-approved technology business incubators** (TBIs), often in universities
- **College/university-based incubators** in the nation's premier institutions such as IIMs and IITs
- **Industry-led incubator/accelerator programs** such as NASSCOM 10,000 Startups
- **Private accelerator programs**, often led by VCs, such as Axilor Ventures, Sequoia Capital's Surge, and others
- **Government-sponsored programs** such as iStart Rajasthan and Kerala Startup Mission

2.5 Government Support through Startup India and Other Initiatives

In 2012, India's market regulator SEBI had introduced new norms for angel investors to be registered as AIFs as a new class of pooled-in investment vehicle for real estate, private equity (PE), and hedge funds. To prevent abuse of the regulation through money laundering, SEBI restricted investment by such funds to INR 5–50 million and only in companies incorporated in India not more than 3 years old, and with no family connections. By 2019, INR 17 billion had been invested in 254 startups through SEBI's AIFs and SIDBI committed a further INR 31 billion, as of July 2019, to 47 AIFs registered with SEBI (FE Online 2019).

Table 3: Indian Government Initiatives to Create a Conducive Ecosystem for Emerging Businesses and Startups

Timeline	Government Program	Aims and Target
2009	Invest India	Creation of an investment promotion and facilitation agency
2009	IndiaStack and UiD	Digital push for cashless, paperless, consent-based scalable architecture to support Aadhaar – Universal Identification project
2013	SEBI's Alternative Investment Fund Regulations	New norms for angel investors, who provide funding to companies in their initial stages
2014	Make in India	Flagship initiative of the Government of India (GoI) aimed at making the country a "global design and manufacturing" destination
2015	Digital India	Flagship program of the GoI aimed at expanding e-governance to promote inclusive growth and transform India into a "digitally empowered society and knowledge economy"
2015	Skill India initiative	A vocational training and certification program aimed at giving 400 million youth the opportunity for a better livelihood by 2022
2016	Startup India Initiative	Flagship initiative of the GoI to catalyze the startup culture and build an ecosystem for innovation and entrepreneurship
2016	Startup India Online Portal	367,171 registered startups, 26,374 recognized startups, 221 I tax exemptions, and 264 were funded by SIDBI FFS (as of 31 December 2019)
2016	Atal Incubation Centres (AICs) under Atal Innovation Mission (AIM)	31 AICs have been funded with INR 1.4 billion (approximately $20.39 million) and INR 576.8 million ($8.12 million) disbursed
2016	SIDBI "Fund of Funds for Startups (FFS)"	INR 100 billion corpus (approximately $1.4 billion) contributing to the Alternate Investment funds (AIFs) for investing in startups
2016	Bharat Interface for Money (BHIM) and United Payment Interface	Mobile payment app developed by the National Payments Corporation on the United Payments Interface to allow seamless and verified payments
2019	Technology Incubation and Development of Entrepreneurs (TIDE) 2.0	MeitY-sponsored program to promote socially relevant tech entrepreneurship through incubators engaged in supporting ICT startups using emerging technologies (IoT, AI, blockchain, etc.)

Source: Compiled by authors from multiple sources including DPIIT Annual Report 2018–2019, Press Information Bureau (2020), and NITI Aayog (2016).

When the Startup India program was launched in January 2016, the GoI also announced a Fund of Funds for Startups (FFS) at the Small Industries Development Bank of India (SIDBI) with a corpus of INR 100 billion to be allocated to alternative investment funds (AIFs). In the 4 years since, this FFS has consistently fallen short of its targeted allocations, both in terms of direct investments in startups (only INR 6.02 billion across 142 startups) and in its allocation to AIFs (INR 226.5 million versus a targeted INR 33 billon) (Sen 2019).

The government has also set up various other initiatives that tie into supporting startups and entrepreneurship (Table 3).

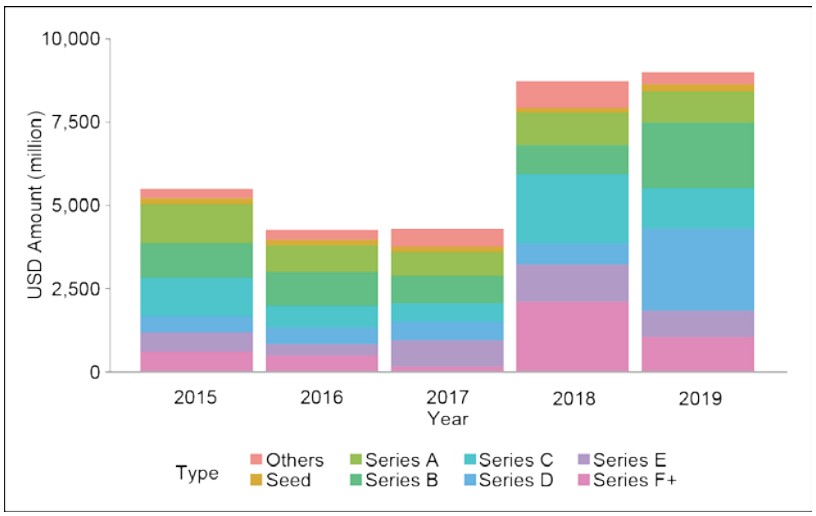
A look at the industry-academic-government linkages in patents, for example, shows that India is emerging as a patent hub, especially with newer government initiatives such as the Startup Hub at the Ministry of Electronics and Information Technology (MeitY), which helps strengthen 51 incubation hubs through fast-track patent clearances, with India known to have far fewer international patents filed vis-à-vis other countries like the Republic of Korea and Japan.

3. TRENDS IN PE/VC INVESTMENTS IN STARTUPS

3.1 From Seed to VC Activity in India in Terms of Number of Deals and Investments

Early-stage investments contracted between 2015 and 2017 and have been recovering since then (Figure 4). Between 2015 and 2017, Series A to C funding dominated investments according to data from Venture Intelligence while 2018 saw late-stage funding (Series D+) peak. Industry experts attribute this reluctance to back early-stage ventures to a lack of exits for angel investors and cumbersome regulatory policies, particularly around taxation. The track record of Angel investors getting an exit at Series A has not been very good in India, as exits are only viable for established startups that have a growing and paying customer base, which usually happens at a later stage.

Figure 4: Types of Investments in Startups in India, 2017–2019 ytd



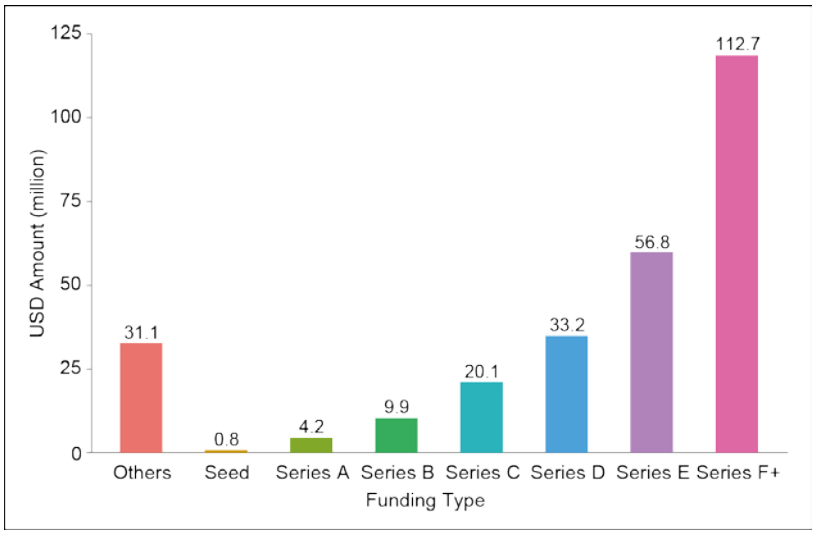
Note: Data for 2019 are as of 24 December 2019.

Source: Plotted by author based on data from Venture Intelligence.

Not surprisingly, deals are fewer and yet larger in terms of value at later stages as investors are willing to put in more capital once the startup has achieved some commercial success and requires more resources to scale and expand. The size of investments per deal for YTD 2019 suggests that Series F and beyond (average: $128 million), followed by Series D ($53 million) and Series E ($52 million). Early-stage deals were naturally much smaller: Seed funding averaged $1.12 million per deal, while Series A averaged $5.12 million (Figure 5), but in spite of that, Series B and funding have cumulatively grown in the last 2 years.

VC investors continue to be bullish on Indian startups despite the larger macroeconomic slowdown. These investors are taking a long horizon view of up to 7 years of consumption-led growth through this period. A few significant exits have also created more liquidity for them to reinvest in the ecosystem.

Figure 5: Average Deal Size by Funding Round in Indian Startups, 2015–2019 ytd



Note: Data for 2019 are as of 24 December 2019.

Source: Plotted by author based on data from Venture Intelligence.

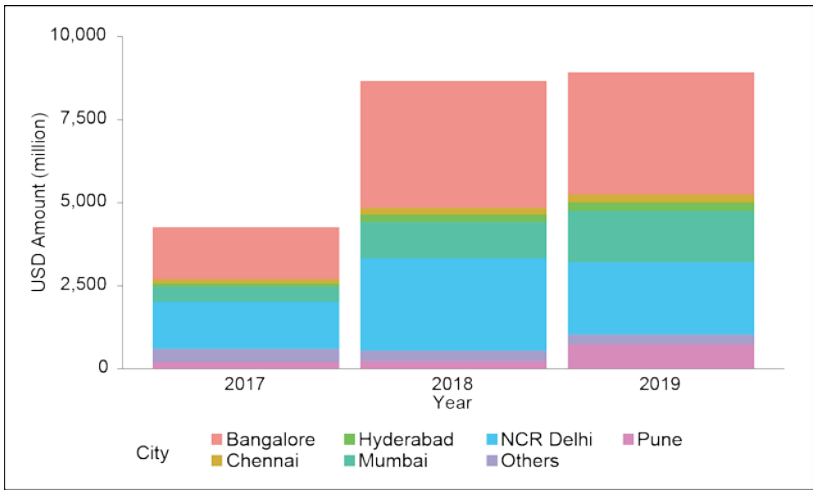
With an estimated 50,000 technology-based startups, global VC and PE firms are investing heavily in India in search of the next "unicorn." The year 2019 saw the most venture capital inflows, with not only US-based and homegrown investors but Chinese investors betting bigger on Indian startups. Since 2018, Chinese VC investments have been the biggest trend in India's startup financing story, as they play catchup with their US counterparts. Tracxn (KrAsia Writers 2019) reported that in 2018, Chinese VCs invested $5.6 billion in India, more than what came from both the US and Japan.

3.2 Geographic Distribution of Investments and Activity

India's startup ecosystem remains concentrated in three major regions, Bengaluru, Delhi-NCR (National Capital Region), and Mumbai, which together accounted for 87% of total investment value and 84% of total investment volume in 2015. This ratio has not changed much since then, and even in H1 of 2019, the three regions together accounted for about 85% of all the funding deals in Indian startups. Bengaluru particularly stands out as India's Silicon Valley owing to its legacy as an IT hub, receiving $16.2 billion in funding across 1,244 deals between 2014 and September 2018 (Rajan 2019). This concentration of startups in these three cities is extremely skewed as they host top-tier universities, and also serve as IT-enabled and financial hubs since the 1990s that attract a growing list of PE and VC firms.

After these three Tier 1 metros the largest startup clusters are in the other Tier 1 cities of Chennai, Hyderabad, and Pune, though these cities lag behind the leaders significantly in terms of both value and investments. These six cities received almost all the VC funding in 2019 (Figure 6). While startup ecosystems are well established in Tier 1 cities, they are still nascent in smaller cities. Only 20% of the 50,000 startups in India are based in Tier 2 and Tier 3 cities and they have raised only a small fraction of total funding. The 5,800 startups in Tier 2 cities together raised only $1.3 billion in total funding between 2004 and Q1 2019 (NASSCOM and Zinnov 2019).

Figure 6: VC* Investments in Indian Startups by City, 2017–2019 ytd



Data for 2019 are as of 24 December 2019.

*As of 24 December 2019. VC is defined as Seed to Series F investments in companies less than 10 years old (since registration).

Source: Plotted by author based on data from Venture Intelligence.

This highly skewed scenario is a great opportunity to develop the startup community in Tier 2 and 3 smaller cities and among disadvantaged sections of the population. More support is needed to provide an opportunity to develop "zebra startups," young companies pursuing both profit and purpose, which are often started by women and other underrepresented founders outside the traditional innovation clusters in smaller cities and towns.

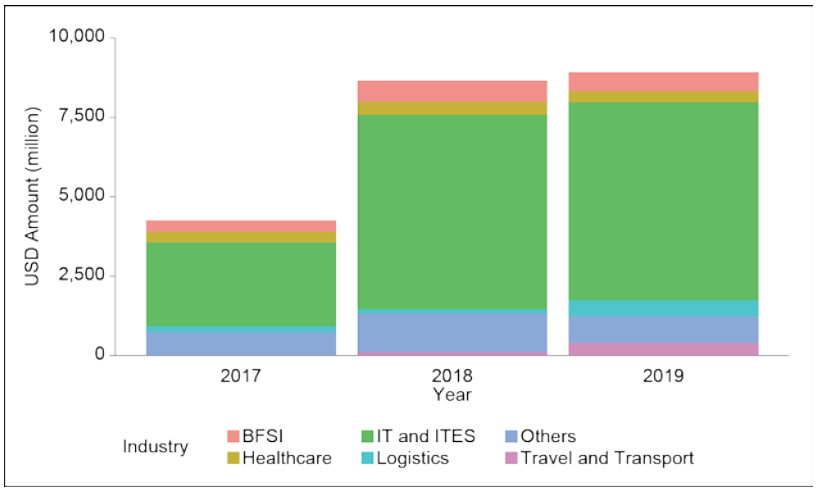
The government too is taking initiatives to boost entrepreneurship in smaller cities through its Startup India Yatra, startup training, and a States' Startup ranking, among others (DPIIT 2019). These initiatives will benefit from India's 100 Smart Cities Mission in providing infrastructure support like fast internet connections, uninterrupted power supply, transport connectivity, and favorable working conditions in terms of legal support, company laws, and regulations. Many states are in the process of developing their own state- and city-level startup ecosystems to capitalize on local talent and the lower costs in smaller cities.

3.3 Sector and Emerging Subsegment Investments

Looking at sector trends in startup investments, IT and IT-enabled services (ITES) topped investment value, followed by the banking and financial services industry (BFSI), healthcare, and logistics (Figure 7). Since 2018, more VC investments have also gone into tourism and transport.

Digital transformation and tech-enabled startups such as online aggregators have largely benefited from improving price discovery, removing middlemen, and reducing transaction costs for both the producers and end consumers. Startups operating in the following traditional sectors that benefited from the digital transformation garnered more investments suggesting large market size and higher returns: B2C consumer technology such as e-commerce, transportation and mobility, healthtech, foodtech, FinTech/payments, and edtech. The trend has recently shifted to growth in edtech, mobility, social media and regional language content, and B2B e-commerce, among others.

Figure 7: VC* Investments in Indian Startups by Industry, 2017–2019 ytd



Data for 2019 areas of 24 December 2019.

Source: Plotted by author based on data from Venture Intelligence.

Another recent trend has been in the boom of regional language-based social media and content sharing due to growing smartphone ownership and internet penetration through cheaper data plans, online payment integration, and better network connections in Tier 2 and Tier 3 cities. In 2009, there were only 54 million internet users, but this expanded tenfold to 530 million in 2018 (Kantar IMRB 2019) with a larger rural population of Indian-language users going online with an annual spending power of $300 billion (Jha 2019). Further, the telecom war that ensued after a new entrant, Reliance Jio, entered the market in 2016 gave Indians the world's cheapest data plans at less than $0.10 a GB, which nearly commoditized the internet and opened up an entire new user base. The Unified Payments Interface (UPI), a government-sponsored digital payment mechanism, has proved crucial for widespread adoption of online and mobile payments.

However, for the government to achieve its goal of India becoming a trillion-dollar digital economy in the next few years, access to technology needs to be democratized to provide a positive socioeconomic impact. This includes supporting more advanced technologies such as AI, deep-tech, and machine learning, and developing scalable business models that benefit a larger population such as in education, mobility, health and fitness, and agriculture.

3.4 Unicorns and Potential Disruptors

For the Indian startup ecosystem, 2019 was the year of unicorns, with eight more joining the club (Table 4). Though India has the third-largest startup market by value, it only has a meager 26 unicorns when compared to the over 200+ unicorns in the US and the PRC. Projections by Fosun RZ Capital (Outlook 2019) suggest that India is likely to have 54 tech unicorns by 2024. What started as a testing ground a decade ago for US-based VC firms such as Tiger Global and Sequoia Capital, which were looking for the next big market after the US and the PRC, India has now emerged as one of the most promising destinations for investors from the PRC, the Republic of Korea, Japan, and the UAE.

Table 4: India's Unicorn Club: Current Private Companies Valued at $1 billion+

Startup	Valuation (in US$)	Year of Valuation	Industry and Vertical	Key Investors
*MuSigma	$1.5 billion	2013	Analytics	Accel Partners, Sequoia Capital India, General Atlantic
InMobi	$1 billion	2014	Mobile and telecommunications (ad-tech)	Kleiner Perkins Caufield and Byers, SoftBank Corp., Sherpalo Ventures
Snapdeal ↓	$7 billion	2014	E-commerce and direct-to-consumer	SoftBankGroup, Blackrock, Alibaba Group
Ola Cabs	$6.32 billion	2014	Auto and transportation	Accel Partners, SoftBank Group, Sequoia Capital
Zomato	$2.18 billion	2015	Internet software and services	Sequoia Capital, VY Capital
One97 Communications (Paytm)	$16 billion	2015	FinTech	Intel Capital, Sapphire Ventures, Alibaba Group
*Quikr ↓	$1.6 billion	2015	Online classifieds	Matrix Partners, Omidyar Network India, Norwest, Kinnevik
Hike	$1.40 billion	2016	Mobile and telecommunications	Foxconn, Tiger Global management, Tencent
*Shopclues ↓	$1.1 billion	2016	E-commerce	Nexus Ventures, Helion Ventures, Beenos, Tiger Global, Kalaari Capital
ReNew Power	$2 billion	2017	Other	Goldman Sachs, JERA, Asian Development Bank
BYJU'S	$5.75 billion	2017	Edtech	Tencent Holdings, Lightspeed India Partners, Sequoia Capital India
Udaan	$2.30 billion	2018	Supply chain, logistics, and delivery	DST Global, Lightspeed Venture Partners, Microsoft ScaleUp
Swiggy	$3.30 billion	2018	Supply chain, logistics, and delivery	Accel India, SAIF Partners, Norwest Venture Partners
PolicyBazaar	$1.50 billion	2018	FinTech	Info Edge, SoftBank Capital
OYO	$10 billion	2018	Travel	SoftBank Group, Sequoia Capital India, LightSpeed India Partners
BillDesk	$1.80 billion	2018	FinTech	Temasek Holdings, Visa, March Capital Partners
Freshworks	$3.5 billion	2018	SaaS	Accel Partners, Tiger Global, Google, Sequoia Capital
Ola Electric Mobility	$1 billion	2019	Auto and transportation	SoftBank Group, Tiger Global Management, Matrix Partners India
Delhivery	$1.50 billion	2019	Supply chain, logistics, and delivery	Times Internet, Nexus Venture Partners, SoftBank Group
BigBasket	$1 billion	2019	Supply chain, logistics, and delivery	Alibaba Group, Bessemer Venture Partners, Helion Venture Partners
Dream11	$1 billion	2019	Internet software and services	Kaalari Capital, Tencent Holdings, Steadview Capital
Rivigo	$1.07 billion	2019	Supply chain, logistics, and delivery	SAIF Partners India, Warburg Pincus, Trifecta Capital Advisors
Lenskart	$1.50 billion	2019	E-commerce and direct-to-consumer	Chiratae Ventures, PremjiInvest, SoftBank
*Citius Tech	$1.0 billion	2019	IT healthcare	General Atlantic, Baring Asia
*Icertis	$1.0 billion	2019	Contract management	Eight Roads, B. Capital, PremjiInvest
*Druva	$1.0 billion	2019	Data management	Westbridge, Nexus Venture Partners, Sequoia Capital India

↓ Indicates a "former" unicorn – a company that is no longer valued at $1 billion or more.

*Source: Venture Intelligence: (https://www.ventureintelligence.com/Indian-Unicorn-Tracker.php).

Source: CB Insights (https://www.cbinsights.com/research-unicorn-companies).

4. EMPIRICAL DETERMINANTS OF STARTUP INVESTMENTS IN INDIA'S SUBNATIONAL ECONOMIES

In this section, we present a simple empirical examination of the possible determinants of startup investments in India's subnational economies. We first begin by documenting some stylized facts about the magnitude of startup investments in India. This demonstrates significant variation and clustering around specific subnational economies. Subsequently, we empirically attempt to identify the conditioning variables that could be instrumental in driving such investments. To do this, we assemble panel data at the subnational level dictated by the availability of data on startup investments and accordingly undertake a panel estimation.[1]

4.1 Stylized Facts

A snapshot of the geographical spread of startup investments across the country over the sample period of 2015–2018 is provided in Figure 8Figure . A few salient trends emerge. First, in line with Bengaluru being one of the sought-after destinations for startups, the magnitude of investments channeled into the state of Karnataka is greater than in the rest of the country. To put this into perspective, available data show that Karnataka received startup investments [2] to the tune of $13 billion, which is approximately half of the total startup investments funneled into India during this period.

Other states that have seen notable startup investments include Maharashtra, followed by Haryana and New Delhi. While Maharashtra has received close to $5 billion, Haryana (chiefly Gurgaon, which is part of the National Capital Region) and New Delhi have attracted about $3 billion each (Figure 8). It is worth noting that these four subnational economies have accounted for over 90% of the startup investments in the entire country, thereby highlighting the asymmetric nature of the investment distribution. Almost all 29 states in India have a Startup Policy and Program in place, of which Karnataka, Rajasthan, Maharashtra, Karnataka, Telangana, and Goa (to some extent) have some tangible track record.

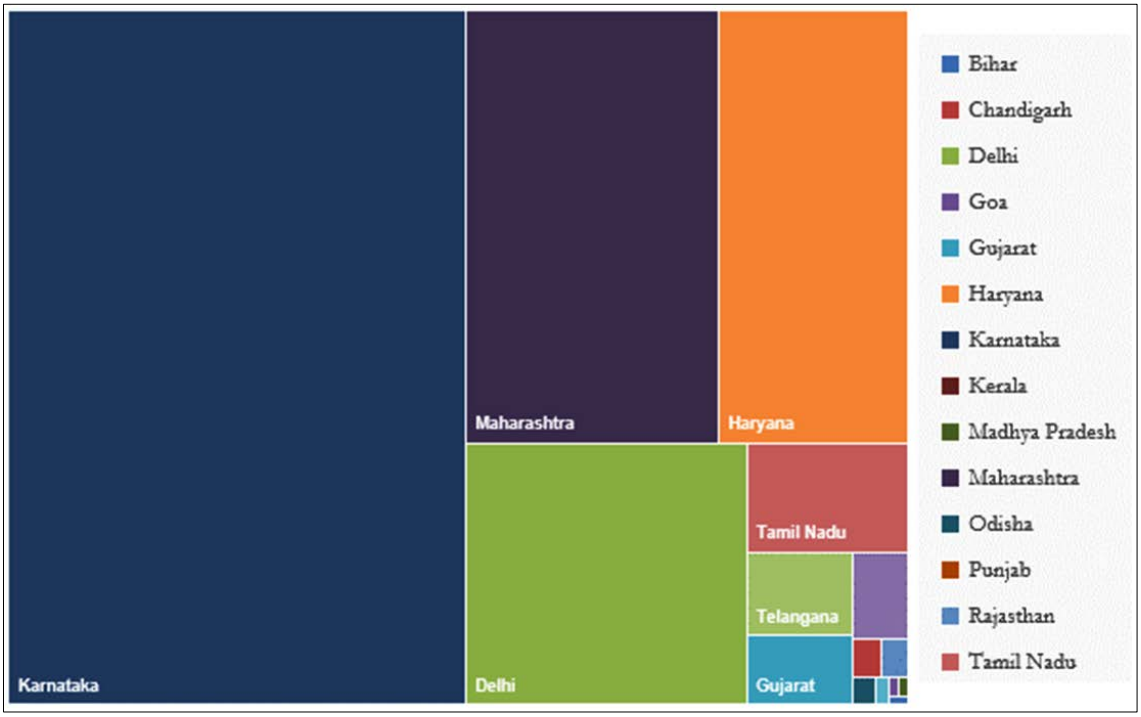
Nevertheless, there are other states that are rapidly emerging as hot spots for startup investments. Tamil Nadu, for instance, attracted close to $0.7 billion, while Telangana (of which Hyderabad is the capital) and Gujarat each received about $0.4 billion and $0.3 billion, respectively, during the corresponding period.

Before we proceed with further empirical analysis, considering the variation in the values of startup investments, we apply a logarithmic transformation of the series to deal with extreme values of the distribution. We first show the mean value of startup investments by each state in Figure 9, while the disaggregated time trends between 2015 and 2018 are plotted for each state. As Figure 8 shows, in line with what was stated earlier, the average investments of the top-four states are significantly higher than those of the rest of the states with active startup policies, while Madhya Pradesh, Punjab, and Kerala have received the lowest investments comparatively (on average).

[1] All data on startup investments are collected from a publicly available independent source, available at www.trak.in.

[2] Note that this overall figure captures startup funding and investments of all types including seed funding, venture capital, debt, and equity financing as well as Series A to H.

Figure 8: Geographical Spread of Startup Investments 2015–2018

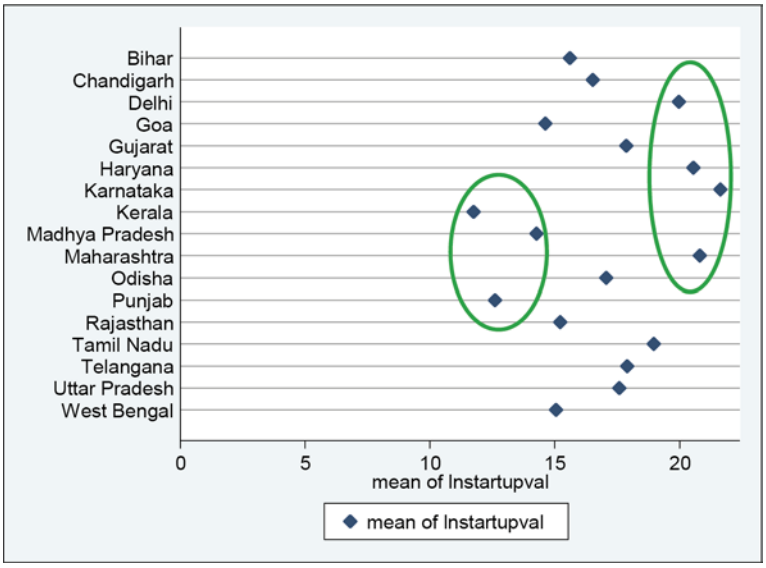


[a] In 2011, the Government of India approved the name change of the State of Orissa to Odisha. This document reflects this change. However, when reference is made to policies that predate the name change, the formal name Orissa is retained.

Note: States in gray denote negligible or no investments.

Source: Authors based on data compiled from www.trak.in.

Figure 9: Average Value of Startup Investments (Log Transformed) Across Subnational Economies



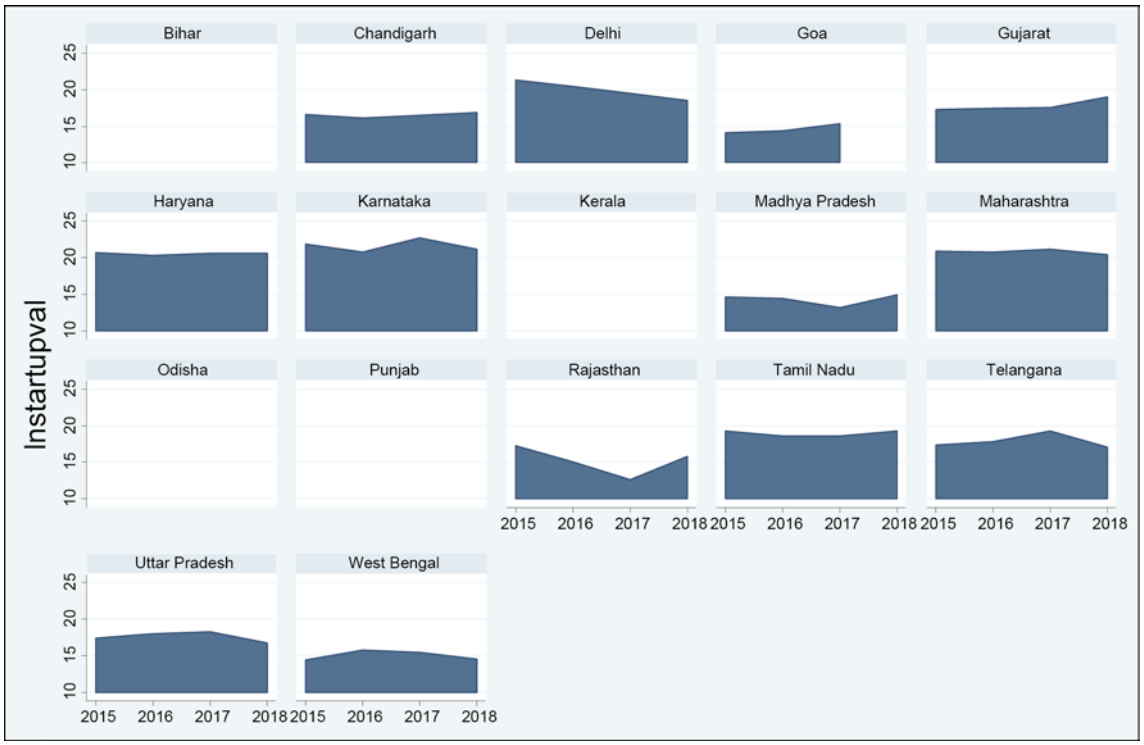
[a] In 2011, the Government of India approved the name change of the State of Orissa to Odisha. This document reflects this change. However, when reference is made to policies that predate the name change, the formal name Orissa is retained.

Source: Authors based on data compiled from www.trak.in.

Figure 9 highlights the trends in these investments across states over the period of analysis. Interestingly, Figure 10 unmasks the variations that average figures did not capture. While in totality, the broad trends in terms of magnitude of investments remain the same in the top four subnational economies, it appears as if the startup investments in Delhi-NCR appear to have been on a gradual declining trend since 2015.

While Karnataka has experienced some significant fluctuations since 2015, things have remained broadly consistent in Maharashtra and Haryana. It is notable that with the exceptions of Gujarat and Rajasthan, most other states for which data are available appear to be experiencing a slowdown in startup investments. While more analysis would be needed to identify whether such swings are merely cyclical or driven by structural characteristics of the subnational economies attracting such investments, it is worth noting that this period coincided with two large domestic shocks in the form of demonetization (November 2016) and the introduction of the Goods and Services Tax (July 2017).

Figure 10: Distribution of Startup Investments by Subnational Economies (2015–2018)



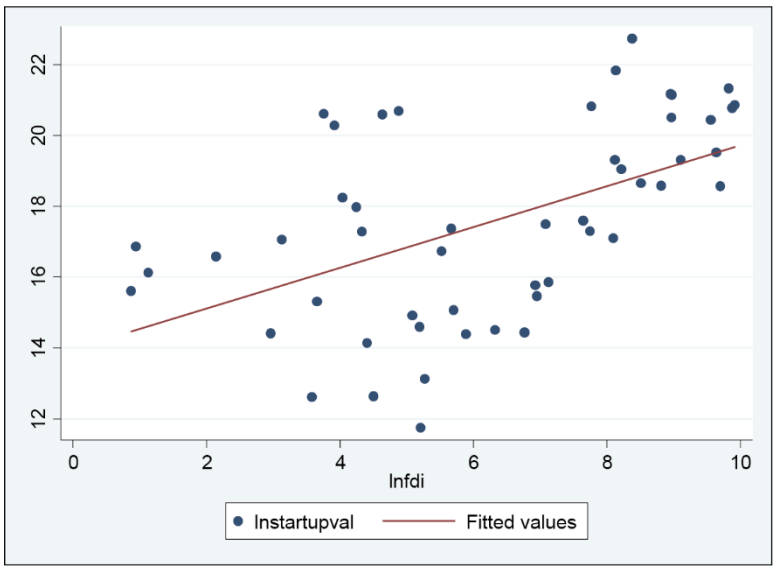
[a] In 2011, the Government of India approved the name change of the State of Orissa to Odisha. This document reflects this change. However, when reference is made to policies that predate the name change, the formal name Orissa is retained.

Source: Authors based on data compiled from www.trak.in.

To what extent are startup investments correlated with the influx of foreign direct investment (FDI) inflows into India's subnational economies? We plot the correlations between the two variables graphically as shown in Figure 11. The scatterplot reveals an upward-tending relationship, although the fit does not appear to be quite tight. Given the conflated nature of startup investments and FDI flows into states (since it is not very clear whether startup investments overlap with the FDI data as the information

on equity stakes is not systematically available) we do not include it as a regressor in the model.

Figure 11: Relationship between Startup Investments and Sub-National FDI Inflows



Source: Authors.

To understand better the determinants of these startup investments and the extent to which distinct subnational characteristics influence the influx of such investments, we perform a more systematic empirical examination below.

4.2 Determinants of Startup Investments

Before we proceed with the empirics, two caveats on the data and modeling strategy are in order. First, we assemble systematic data on the magnitude of startup investments at the subnational level from 2015 to 2018 purely dictated by data availability. While snapshots of historical data from the decade of the 2000s can be gathered for the country as a whole, no systematic breakdown at the subnational level is available in the public domain.

Second, given the short time dimension of the panel data and the fact that this period coincided with domestic policy shocks, using corresponding years of data on the key macroeconomic characteristics of subnational economies in a contemporaneous fashion leads to significant joint endogeneity concerns. While we cannot rule out endogeneity concerns completely, we can, as far as possible, limit these by using lagged values of the covariates. Since we are not constrained by data availability for the covariates, we lag all covariates by 3 years.[3] Further, by adopting a standard two-way fixed-effects model and allowing state and year fixed effects, we attempt to minimize endogeneity issues arising from omitted variable bias.[4]

[3] Our fundamental results are robust to the choice of different lags.

[4] Time fixed effects are included to ensure that we account for year-specific trends in our model.

Thus, we construct a panel data set featuring 17 Indian subnational economies over the period 2015–2018.[5] The basic estimating equation is as follows (Equation 1):

Equation 1:

$$y_{it} = \delta_i + \beta \boldsymbol{X}_{it-3} + \rho_t + u_{it} \quad (1)$$

y_{it} is the log-transformed value of startup investments in subnational economy *I* at time *t;*

$\boldsymbol{X}_{it}$ is the vector of determinants in subnational economies *i* at time *t-3*;

δ_i is subnational economy fixed effects;

ρ_t *is* time fixed effects;

u_{it} is the idiosyncratic error term.

The dependent variable in our empirics is the log-transformed value of startup investments in the respective subnational economy at a given point in time. Most estimating models, such as the one given in Equation 1, tend to violate conditional mean independence, which is a prerequisite to obtain unbiased and consistent estimates. The specific source of violation of conditional mean independence typically arises from omitted variable bias. As has been well established in the literature, the unobserved effects model as given in Equation 1 allows us to undertake a within transformation that in turn enables us to handle the unobserved heterogeneity bias resulting from estimating it, as long as the unobserved variables that could be potentially correlated with our regressors are time-invariant in nature. In such circumstances, we can reasonably argue that our fixed-effects model produces unbiased and robust estimates.

Furthermore, as noted earlier, the matrix of determinants of startup investments are based on available empirical literature. Empirical studies on determinants of startup rates at the subnational or regional level within a developing country context are limited (e.g., Naudé et al. 2008 and references cited within), although there is a huge tangential empirical literature on determinants of entrepreneurship at the firm level (e.g., Audretsch and Keilbach 2004; Acs, Armington, and Zhang 2007 for a discussion). We take a cue from this literature and estimate a parsimonious model that includes the following representative control variables at the subnational level:

- GSDP Per Capita Growth (+)
- Inflation (–)
- State Budget Deficit (–)
- Bank Credit (+)
- Infrastructure (+)
- Human Capital (+)
- Secondary Industry Value Added Per Worker (+)

Table A1 has the definitions and sources of the variables used.

On the one hand, we hypothesize that higher growth in the subnational economies, greater availability of bank credit, higher availability and coverage of hard infrastructure (like railways, roads, and telecommunications), as well as higher labor productivity and human capital should be positively associated with higher startup investments. On the

[5] The choice of the time period and the sample of subnational economies were purely based on consistent availability of data for the value of startup investments (our focal dependent variable of interest).

other hand, a priori, we believe that a higher cost of living proxied by inflation and higher fiscal deficit of the states reflecting the government's fiscal responsibility should deter startup investments. As briefly mentioned earlier, all covariates are collected from publicly available data on Indian states from the Reserve Bank of India and they are lagged by three periods (different lag lengths were tried as a robustness check) to avoid simultaneity problems. The correlation matrix presented in Table 5 provides further evidence that there are no serious concerns over multicollinearity that we need to worry about before estimating our model.

Table 5: Correlation Matrix

	GSDP PC Gr	Inflation	Budget Def	Bank Credit	Infra	Human Cap	Secondary VA
Startup value	1.00						
GSDP PC Gr	0.02	1.00					
Inflation	–0.11	0.13	1.00				
Budget Def	0.11	–0.29	0.00	1.00			
Bank Credit	0.54	–0.15	–0.04	0.20	1.00		
Infra	0.09	–0.15	–0.10	0.33	0.02	1.00	
Secondary VA	0.00	0.04	–0.07	0.13	–0.15	–0.21	1.00
Human Cap	0.19	0.07	–0.36	–0.01	–0.06	0.02	–0.16

Source: Authors.

Table 6 summarizes the empirical results. Columns 1 and 2 estimate the same regression as in Equation 1 with and without year fixed effects, respectively. The magnitude and the direction of the coefficients are actually comparable across both the models. Most results are in accordance with the priors, but in terms of statistical and economic significance, there are a few notable observations.

First, focusing on the significant variables of interest, among the macro variables, fiscal deficit of the states carries the right negative sign and turns out to be the most consistent variable in terms of high statistical and economic significance. The results appear to imply that a higher fiscal deficit in subnational economies deters startup investments, in line with our priors.

In a similar vein, higher labor productivity and better infrastructure enter the regression with the appropriate positive signs and statistically significant coefficients, suggesting that higher labor productivity and better infrastructure tend to attract higher startup investments.

Perhaps the most important finding emerging from the empirics is the role of bank credit. As one would expect, higher availability of bank credit, which can also be a loose proxy for subnational financial depth, appears to be positively and significantly associated with higher startup investments, underlining the importance of bank credit. This finding is also consistent with the prior empirical literature.

Other macroeconomic variables – growth in GDP per capita and inflation – turn out to be statistically insignificant, although both carry the appropriate signs. Note that GDP per capita growth turns statistically significant at the 5% level when we remove year fixed effects. The human capital variable proxied by secondary education also turns out to be statistically insignificant, though it carries the right sign.

Table 6: Determinants of Startup Investments: Fixed Effects Estimates

	(1)	(2)	(3)	(4)
Dep Var: Ln Startup Investments	**Two-Way FE**	**Without Year FE**	**Competitiveness Index**	**Dep Var: Ratio of Startup to Total Investments**
GSDPPC Growth	0.506	0.473**		0.408**
	(0.330)	(0.226)		(0.164)
Inflation	-0.101	-0.019		-0.052
	(0.118)	(0.054)		(0.066)
Budget Deficit	-0.037**	-0.031**		-0.025**
	(0.016)	(0.014)		(0.011)
Bank Credit	1.439***	1.484***		1.770***
	(0.500)	(0.484)		(0.370)
Infrastructure	0.517*	0.477*		0.321*
	(0.299)	(0.282)		(0.173)
Secondary Value Added	1.739**	1.638**		2.599**
	(0.840)	(0.807)		(0.925)
Education	0.009	0.028		0.021
	(0.0633)	(0.0425)		(0.047)
Competitiveness Index			1.304***	
			(0.502)	
Observations	50	50	51	
Number of States	16	16	17	
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	Yes

Robust standard errors clustered for states in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1.

Source: Authors.

The above empirical results also have significant policy implications, especially when it comes to the role of financial deepening in India's states. Admittedly, a longer panel data set with an extended time period would offer more robust estimates, but we have made use of all publicly available data on startup investments at the subnational level.

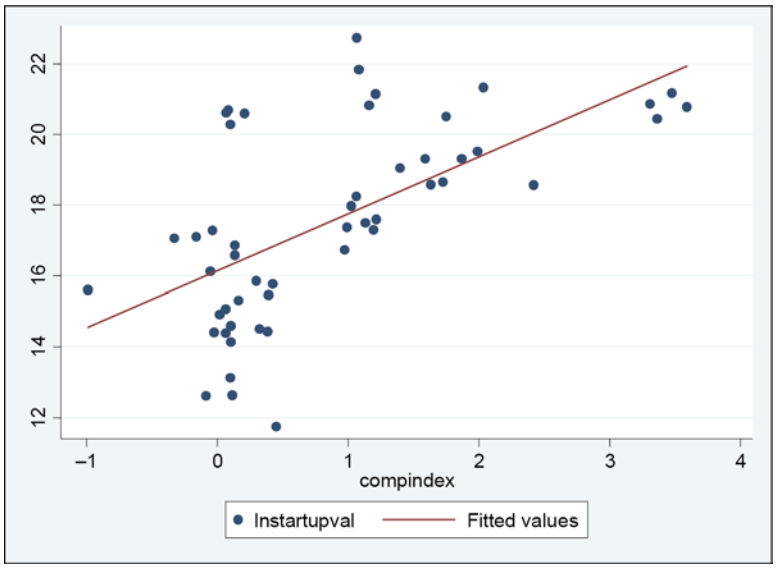
In order to further verify the robustness of the significance of subnational determinants identified by our model, we attempt to make use of a comprehensive and holistic subnational index on competitiveness to check whether state competitiveness matters to startup investments. While it is seemingly obvious that state competitiveness would matter, it is much harder to empirically establish that, especially considering the definitional ambiguities inherent in defining competitiveness. We make use of a subnational competitiveness index available for India's states and union territories to check its potential explanatory power in our model.[6] It is useful to note that this index is a weighted average of 75 different indicators that subsume all the individual

[6] Data for competitiveness index are taken from Tan, Gopalan, and Sharma (2019).

determinants we have used in estimating Equation (1). Hence, we include a comprehensive index as a stand-alone regressor in addition to two-way fixed effects. The results are shown in Column (3) in Table 6. As we would expect, a 1% increase in the state competitiveness index would result in a 1.3% increase in startup investment, which is an economically powerful result as well.

We also plot the nature of correlations between state-level competitiveness index and startup investments graphically. The scatterplot shown in Figure 12 does reveal an upward-tending relationship between the two variables of interest, and also appears to be a reasonably good fit. These add a measure of robustness to our results.

Figure 12: Relationship between Startup Investments and Sub-National Competitiveness



Source: Authors.

As our final robustness check, we rerun our regression using an alternative dependent variable. Instead of using absolute values of startup investments, we express it as a share of total investments in that subnational economy in each year. The results as summarized in Column (4) of Table 6 clearly show that the fundamental results established so far remain more or less robust to, and consistent with, the use of a different dependent variable, thereby highlighting the consistency of our empirical results.

5. CREATING A CONDUCIVE ENVIRONMENT FOR STARTUPS

5.1 Challenges Faced by Startups in India

It is still early days for the Indian startup ecosystem and scaling challenges include:

1. A large market opportunity but Indians still do not have the discretionary income needed to create unparalleled products. India's middle class of about 78 million only earn INR 250,000 per year according to the National Institute for Applied

Economic Research (*The Economist* 2019) and only 50 million have shopped online (Google, Bain & Company and Omidyar Network 2019).

2. Startup revenue projections can be skewed due to the inconsistencies in the Indian market with VCs struggling to make outsize returns on their investment, but in spite of that, Asian investors, especially the Chinese and Japanese, are aggressive about India.
3. Financing still remains a challenge for Indian startups. While deal sizes of VC funding are significantly smaller than in Silicon Valley, considering India is an emerging economy, domestic lending rates are very high at three times those of developed economies, which incentivizes foreign funds to lend at cheaper rates.
4. Regulatory and taxation complexities also affect startup profitability. Corporate tax rates are high, although recently reduced to 22% and 14% in 2019 from 33%. Terms for startups to qualify for government benefits are too stringent and the application process cumbersome, and once revenues exceed INR 1 billion they are disqualified. This has led to a third of the entrepreneurs actively looking at relocating out of India to reduce compliance and tax burdens, according to a survey (LocalCircles 2019).
5. Indian startups, like their global counterparts, struggle with a high failure rate with technology venture success rates at lower than 5% worldwide. While incubators and accelerators have been most effective in supporting startups, the government will need to focus on simplifying regulation around registering companies, bankruptcy laws, and getting failed entrepreneurs back into the system.
6. Many Indian startups want to expand globally but face issues of credibility, except for software as a service (SaaS players) players, and even such entrepreneurs cannot tap into a global market as they are often unaware of global market opportunities.
7. India also struggles with a lack of innovation, lagging behind Japan, the PRC, and the Republic of Korea in international patents. One study cited lack of innovation as the most common reason for the high rate of failure (IBM Institute for Business Value and Oxford Economics 2016).
8. A lack of skilled workforce, inadequate formal mentoring, and poor business ethics with over 70% of India's engineering graduates being considered "unemployable." New emerging industries such as deep-tech and deep-science startups that are technology based are hampered by the lack of specialized talent (PhDs, researchers, etc.).
9. Even though MeitY and the DST are forging institutionalized industry-academic-government linkages and collecting the data on Indian startups, a lot more work is needed in this space, in producing a conducive environment and providing much needed support for startups.

6. CONCLUSION: THE ROLE OF GOVERNMENT IN FURTHERING STARTUP POLICY POST-2020

Empirically, we have seen in this study that the increased competitiveness of states accounts for increased investments in startups within those states. This suggests that when states invest more in R&D, making it easier to file patents, and develop tie-ups with

universities and industry by expanding the incubator/accelerator ecosystem, startups benefit from better funding and access to technology and expertise.

The government will now need to focus on raising top-notch technical talent and global business skills through "reverse brain-drain" and making India a startup-friendly nation. India can learn from Israel and countries that invest heavily in R&D, and strengthen linkages between startups, corporates, academic institutions, and the government. India punches above its weight in terms of global innovation and much more can be done in developing human capital and investing in higher education and putting in place an intellectual property strategy in innovation. Startups in India will also require support for entrepreneurs and innovators who are often only interested and constrained in producing their own products and services and do not have the expertise and capacity scale with better accounting, marketing, and sales.

Empirical results show that improving subnational financial depth seems positively and significantly associated with higher startup investments, so increasing credit from banks and NBFCs and getting more startups to qualify for government programs is important.

The government will also need to make provisions or provide relief for startups when implementing macroeconomic policies along the lines of demonetization and implementation of GST and specific regulations such as the "Angel Tax" and the benefits of the Insolvency and Bankruptcy Code. The government already creates awareness about its schemes through outreach programs, but it is critical to continue expanding innovation beyond Tier 1 cities.

The current technology and venture capital system tend to concentrate on quantity over quality, on "unicorns" that disrupt and scale on consumption. They also excessively target quick exits over sustainable growth, and prioritize shareholder profit over shared prosperity, requiring alternate models of financing such as cooperatives and so-called "zebra" startups – firms that address social problems but are for-profit. This will require more incubation support for first-time entrepreneurs to expand beyond overcrowded industry verticals, such as e-commerce, FinTech, ed-tech, and mobility, into the "third sector," such as nonprofits and social enterprises in industries such as media, education, healthcare, governance, sanitation, and alternate/clean energy.

More open data regarding startups for big data analysis such as factor analysis and cluster analysis can help identify successful characteristics of startup enterprises versus potential failure of startups and other challenges. Japan, for example, has been collecting SME data for 20 years, which made the CRD (Credit Risk Database) analyze the characteristics of SMEs. A similar database could be constructed for India to promote financing for startups.

While Chinese startups have enjoyed protection and have entry barriers to well-funded and foreign competition, Indian startups do not have that luxury and therefore have not produced homegrown global game changers (e.g., Amazon in the US and Alibaba in the PRC) without being acquired. But many of these ambitious startups do not have the vision or know-how for global expansion requiring policies to support their internationalization. Singapore set up International Enterprise, a government agency that was created to help these companies establish a global presence. Indian startups need to go beyond just emulating successful global ideas, to the domestic context, and to developing meta-level startups that address fundamental problems that can be scaled globally.

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APPENDIX

Table A1: Sources and Definitions of Control Variables Used in Empirical Analysis

Variable	Unit	Definition	Sources
Gross State Domestic Product per Capita (+)	Rupees Real Prices (Base Year 2000)	Gross State Domestic Product per Capita is Gross State Domestic Product divided by population.	GDP: http://mospi.nic.in/Mospi_New/site/inner.aspx?status=3&menu_id=82
Inflation (Average of Rural and Industrial Laborers) (–)	%	Inflation is measured using all Indian CPI (Industrial Workers and Rural Laborers). The percentage change in this index over a period of time gives the amount of inflation over that specific period, i.e., the increase in prices of a representative basket of goods consumed. The inflation differential is given by state inflation subtracted from all Indian inflation for a given year.	CPI (RL and IW): Ministry of Labor Bureau (Archive)
Human Capital: Student-Teacher Ratio (Secondary) (+)	Ratio	The average number of students per teacher in secondary educational institutions in a given year.	www.indiastat.com
Infrastructure: Paved Road Length (+)	(km per 000 Sq. km)	Total surfaced and unsurfaced lengths of highways, urban roads, and project roads per 1,000 km of total land area of each state.	CMIE, States of India
Bank Credit (as a percentage of GSDP) (+)	10 Million Rupees, Real Prices (Base Year 2000)	The bank credit in scheduled commercial banks, comprising term loans, cash credit, overdrafts, and bills purchased and discounted.	RBI Handbook of Statistics on Indian States
Fiscal Deficit (–)	Percent of GSDP	Gross fiscal deficit expressed as a percentage of gross state domestic product.	RBI Handbook of Statistics on Indian States
Secondary Industry, Value-Added per Worker	Rupees Per Person-Year (Real prices, 2000)	The net value added per employed worker in the secondary industry.	RBI Handbook of Statistics on Indian States

Source: Authors.